CLAIMS

<u>WHAT IS CLAIMED IS:</u>

1. A method for removing organic sulfur compounds from a vent gas stream comprising the following steps:

   contacting the vent gas stream with liquid hydrocarbon stream; and

   absorbing a portion of the organic sulfur compounds from the vent gas stream into the liquid hydrocarbon stream to form an exiting vent gas stream.

2. The method as described in claim 1, wherein the liquid hydrocarbon stream comprises one or more liquid hydrocarbons.

3. The method as described in claim 2, wherein the hydrocarbon stream comprises two or more liquid hydrocarbons.

4. The method as described in claim 1, wherein at least one of the liquid hydrocarbons having a boiling point of between about 180°F and about 430 °F.

5. The method as described in claim 4, wherein the at least one of the liquid hydrocarbons comprises benzene, xylene, toluene, hexane, heptane, octane, nonane, or mixtures thereof.

6. The method as described in claim 4, wherein the at least one of the liquid hydrocarbons comprises a hydrogenated naphtha.

7. The method as described in claim 1, wherein the sulfur concentration of the exiting vent gas stream is less than one percent of the sulfur concentration of the vent gas stream.

8. The method as described in claim 7, wherein the sulfur concentration is less than 0.5% of the sulfur concentration of the vent gas stream.

9. The method of claim 1 further comprising after step (b):

hydrotreating the hydrocarbon stream.

10. The method of claim 1 further comprising after step (b):

routing the exiting vent gas stream to an incinerator or a heater.

11. The method of claim 1, wherein the organic sulfur compound removed is a sulfide.

12. The method of claim 11, wherein the organic sulfur compound removed is a disulfide oil.

13. A method for removing organic sulfur compounds from a vent gas stream having organic sulfur compounds, the vent gas stream further having an initial organic sulfur compound concentration, comprising the following steps:

(a) providing a scrubber, the scrubber having a shell, the shell having an interior cavity, a diameter, a vent gas entry port, a vent gas exit port, and a hydrocarbon entry port;

(b) introducing a hydrocarbon stream into the scrubber through the hydrocarbon entry port;

(c) introducing the vent gas stream into the scrubber through the vent gas entry port;

(d) absorbing a portion of the organic sulfur compounds from the vent gas stream into the hydrocarbon stream to form an exiting vent gas stream; and

(e) removing the exiting vent gas stream from the scrubber through the vent gas exit port.

14. The method of claim 13, wherein the scrubber further comprises gas/liquid contact material, the gas/liquid contact material within the interior cavity of the scrubber.

15. The method of claim 14, wherein the gas/liquid contact material comprises packing, trays, or fiber film contactor.

16. The method of claim 15, wherein the gas/liquid contact material comprises structured packing or ring-shaped packing.

17. The method of claim 16, wherein the gas/liquid contact material comprises either raschig rings or nutter rings, the raschig rings or nutter rings having a diameter.

18. The method of claim 17, wherein the raschig rings or nutter rings are comprised of carbon steel, stainless steel, carbon, or ceramic.

19. The method of claim 17, wherein the raschig rings or nutter rings have a nominal diameter of between 1/2" and 2".

20. The method of claim 14, wherein the scrubber further comprises a packing support, the packing support located within the interior cavity of the shell and able to support the gas/liquid contact material.

21. The method of claim 13, wherein the diameter of the shell is between about 6" and 24".

22. The method of claim 13, wherein the shell comprises carbon steel, stainless steel, ceramic, or an Inconel alloy.

23. The method of claim 13, wherein the scrubber further comprises a liquid distributor, the liquid distributor located within the interior cavity of the shell and in the same plane as the diameter of the shell, the liquid distributor further being within functional proximity of the hydrocarbon entry port.

24. The method of claim 13, wherein the vent gas entry port of the scrubber is mounted on a disulfide separator.

25. A method for removing disulfide oils from a vent gas stream having disulfide oils, comprising the following steps:

(a) providing a scrubber, the scrubber having a shell, the shell having an interior cavity, a diameter, a vent gas entry port, a vent gas exit port, a hydrocarbon entry port, and gas/liquid contact material, the gas/liquid contact material located within the interior cavity of the scrubber;

(b) introducing a hydrocarbon stream into the scrubber through the hydrocarbon entry port, the hydrocarbon stream comprising a least one hydrocarbon, the at least one hydrocarbon having a boiling point of between about 180°F and about 430 °F;

(c) introducing the vent gas stream into the scrubber through the vent gas entry port;

(d) absorbing a portion of the disulfide oils from the vent gas stream into the hydrocarbon stream to form an exiting vent gas stream; and

(e) removing the exiting vent gas stream from the scrubber through the vent gas exit port.